THE MINERAL INDUSTRY OF

ISRAEL

By Thomas R. Yager

Israel was a producer of such metals and metal products as lead, magnesium, and steel, and such industrial minerals as bromine, bromine derivatives, flint clay, gypsum, kaolin, lime, magnesia, phosphate rock, potash, silica sand, and sulfur. Building materials produced in Israel included cement, crushed stone, marble, and sand. The country also cuts imported diamond and produced caustic soda, fertilizers, natural gas, petroleum and petroleum products, phosphoric acid, and sulfuric acid.

The Bank of Israel estimated that the country's gross domestic product (GDP) grew by 5.9% in 2000, compared with 2.4% in 1998 and 2.3% in 1999 (Central Bank of Israel, 2001, p. 3). The construction sector started to recover in the second half of 2000 after declining from 1998 through the first half of 2000. In 2000, the constant dollar value of nonmetallic mineral products and production in the Israeli mining and quarrying industry fell by 8.3% and 2.3%, respectively, and chemicals and refined petroleum and basic metal rose by 3.4% and 1.9%, respectively. Chemicals and refined petroleum accounted for 9.89% of industrial production; nonmetallic minerals, 3.74%; mining and quarrying, 2.74%; and basic metal, 2.08% (Israel Central Bureau of Statistics, April 2001, Manufacturing production indices, by division—New classification, Monthly bulletin of statistics, accessed May 24, 2001, at URL http://www.cbs.gov.il/archive/200104/yarhon/m2_e.htm).

In 1999, the U.S. Central Intelligence Agency (2000) estimated that Israel's GDP amounted to about $105 billion at purchasing power parity. The per capita income at purchasing power parity was $18,300 in 1999.

In 2000, Israel's exports amounted to nearly $28.3 billion. The value of exported diamond was $6.8 billion, of which $5.4 billion was polished and $1.4 billion was rough; this was an increase from $5.7 billion in 1999 (International Monetary Fund, 2001, p. 55). In 2000, Israel exported about 1.76 million metric tons (Mt) of cement, 1.48 Mt of potash, and 1.13 Mt of phosphate rock. Other energy, metal, and mineral products exported in recent years included aluminum, bentonite, kaolin, lead, magnesia, petroleum, salt, silver, titanium, and tungsten, as well as secondary scrap of aluminum, copper, lead, nickel, and steel. Basic metal, mining and quarrying, and nonmetallic mineral products accounted for about 2.6% of exports in 1999 (Israel Central Bureau of Statistics, 2000, p. 8.16).

In 2000, Israel's imports amounted to $35.2 billion, of which nearly $6.4 billion were diamonds. This was an increase from nearly $5.7 billion in 1999. Imports of fuels rose to $3.5 billion in 2000 from $2.1 billion in 1999 (International Monetary Fund, 2001, p. 58); this increase was primarily attributable to higher world oil prices. In 1999, Israel imported nearly 9.6 Mt of coal, 575,500 metric tons (t) of sulfur, 459,000 t of clinker, and 110,000 t of cement. Other metal and industrial mineral imports in recent years included aluminum, asbestos, diatomite, feldspar, gypsum, kaolin, lead, magnesite and magnesia, manganese ore, mercury, phosphate rock, silver, steel, talc, tin and tin alloys, tungsten, and zinc and zinc alloys.

Commodity Review

Metals

Lead.—In November, Harkunas Lead Works, which was Israel's secondary lead smelter and battery reprocessor, indicated that its $1.9 million expansion project would be completed in December. Plant capacity would nearly double to 25,000 metric tons per year (t/yr) of lead; production at full capacity was expected to start in January 2001. The project was driven by rising battery consumption, which caused increased demand for lead from Israeli battery producers (Metal Bulletin, 2000b). Harkunas sourced most of its material from Eastern Europe. Most of the plant's exports were shipped to Greece, Italy, and Spain (Metal Bulletin, 2000a).

Magnesium.—An estimated 23,000 Mt of magnesium chloride is dissolved in the waters of the Dead Sea (Jordan Natural Resources Authority, 1989, p. 104). Dead Sea Magnesium, Ltd. (DSM) [joint venture between Israel Chemicals Limited (ICL) (65%) and Volkswagen AG of Germany (35%)], started production of magnesium metal in 1997, and expected to reach 34,000 t/yr capacity by the end of 2000. The plant's raw material was carnallite, which is dehydrated, melted, and electrolyzed to yield magnesium metal and chlorine. The residual salt and potash were sent to the potash plant for refining (Dead Sea Works, Ltd., 2001, Industrial activity at the Dead Sea, accessed May 22, 2001, at URL http://www.dsw.co.il/history5.htm).

The brines that DSW sold to its sister company Dead Sea Periclase Ltd. (DSP) were used in the production of magnesia. DSP produced 95,000 t/yr of magnesia, of which about 65,000 t/yr was dead burned magnesia. About 10,000 to 15,000 t/yr of dead burned magnesia was fused in-house at Taheto Dead Sea Fused Magnesia Co., which was a joint venture company. DSP produced magnesia with a minimum magnesia content of 99.0% and very little boron, iron, or silica; the company's product tended not to compete with Chinese magnesia. Some refractory manufacturers mix DSP's magnesia with Chinese magnesia to achieve the right balance between composition and price (Pearson, 2000, p. 47-49).

DSP is focusing increasingly upon specialty magnesia markets, including flame retardants, food additives, pharmaceuticals, and polymer additives. Other DSP products include caustic calcinated magnesia, magnesium chloride, and magnesium hydroxide (Pearson, 2000, p. 47-49).

Magnesium from the Dead Sea was also used to produce magnesium chloride flakes. DSW operated the world's largest magnesium chloride flakes plant for such applications as abrasives, deicing, dust suppression, fertilizers, and oil drilling.

Industrial Minerals

Bromine.—The Dead Sea has substantial resources of bromine; an estimated 975 Mt of magnesium bromide is dissolved in its waters (Jordan Natural Resources Authority, 1989, p. 104). Brines and carnallite ores from the Dead Sea were used as raw material for Israel's production of bromine and bromine derivatives. Dead Sea Bromine Group (DSBG) (a subsidiary of ICL) accounted for 35% of world bromine production (Lyday, 2001). DSBG produced bromine derivatives with applications in air conditioning, batteries, cleaning solvents, flame retardants, mineral separation, oil drilling, photography, and water treatment; more than 90% of the company's sales was from exports.

In the first half of 2000, DSBG's sales grew by about 18% owing to rising sales and increased demand for calcium bromide from the oil-drilling industry and flame-retardant products from the personal computer, electronics, and telecommunication industries. DSBG's profits in 2000 were affected by the plea agreement that the company reached with the U.S. Department of Justice concerning an investigation pertaining to allegations of violations of the trade restriction laws in the United States. According to the agreement, DSBG will pay $7 million to the U.S. Government (Dead Sea Bromine Group, September 27, 2000, DSBG sales grew by 18% in the first half of 2000, accessed May 22, 2001, at URL http://www.deadseabromine.com/brome/files.nsf/lookup/FlashNews.htm?OpenDocument). In 2000, ICL increased its share of DSBG to 100% from 89.1%.

Cement.—After declining in 1999 to about 6.35 Mt, Israel's production of cement increased to 6.6 Mt in 2000. Domestic consumption increased to 5.1 Mt from 4.85 Mt. Residential uses amounted to 55% of the domestic demand for cement, and infrastructural, defense, and other users accounted for 17%, 8%, and 19%, respectively. The country's sole producer Nesher Israel Cement Enterprises Ltd. operated the Haifa, Har- Tuv, and Ramla plants. These plants had a total capacity of 8 million metric tons per year. The company greatly reduced particle emissions by closing down three of its old wet kilns and starting up two new dry-process kilns in their place (International Cement Review, 2001, p. 172).

Israel's imports of cement were estimated to be 250,000 t in 2000, which was more than double the 1999 figure of 110,000 t. All imported cement originated from Turkey, and clinker was imported from Croatia, Cyprus, Greece, and Turkey. Exports increased to 1.76 Mt in 2000 from 1.6 Mt in 1999. The majority of exports were shipped to areas in the West Bank under the control of the Palestinian Authority (International Cement Review, 2001, p. 172).

Diamond.—In spite of the recent increase in exports, the Israeli diamond industry was undergoing substantial consolidation. In 1998, 40% to 50% of diamond exports were to the United States. By 2000, this figure had increased to between 65% to 70%. The U.S. market, which was highly competitive, had long credit terms and low profitability owing to higher prices for rough diamond that have not been matched by polished prices. Small to medium manufacturers were most vulnerable to these conditions. Conflict diamond posed another potential difficulty for the industry (Solomon, 2001).

Flint Clay.—Deposits of flint clay occur in the Negev Desert; the alumina content of these clays ranges from 35% to 55%. Negev Industrial Minerals Ltd. (NIM) (a wholly owned subsidiary of ICL) produced flint clay and kaolin at its Mactesh Ramon plant. Most sales of NIM's clays were to the European ceramics and refractory industries or the Israeli chemical, ceramics, and fertilizer industries, which included other ICL companies (Harben and Minster, 1997, p. 61).

Limestone.—Israel has several deposits of limestone that are exploited on a commercial basis. M.P. Minerals and Marble Ltd. mined limestone from Mount Nitzim in the Negev Desert. The limestone was used in the animal feed, chemical, construction, fertilizer, glass, and pharmaceutical industries; other uses include fillers in the adhesives, plastics, paint, and rubber industries. K.G. Powders also mined limestone from the Galilee Mountains for use as a filler. Yehu Clays Ltd. produced calcium carbonate from limestone quarries in the Aroer and Yeroham areas. NIM operated a lime and limestone plant at Mishor Rotem, which produced lime used in aerated blocks (Ytong), paper, and other industries.

Phosphate.—Substantial resources of phosphate rock occur in the northern Negev region. Arad-Rotem, which was the largest deposit, has 300 Mt, and the Zohar, Zin, and Arava deposits have 250 Mt, 150 Mt, and 150 Mt, respectively. Israel's phosphate rock resources were exploited by Rotem Amfert Negev Ltd. (a wholly owned subsidiary of ICL) (Harben and Minster, 1997, p. 59).

In 1999, Rotem produced about 4.13 Mt of phosphate rock, 600,000 t of phosphoric acid (P_2O_5 equivalent), and about 1.6 Mt of fertilizers. The company also produced speciality chemicals and phosphorous salts (Israel Chemicals Ltd., 2000, Israel Chemicals Ltd.—Group companies, accessed May 22, 2001, at URL http://www.israelchemicals.co.il/icl/icl.nsf/frmFrameSet?readform&FrameMenu=group&ItemType=document). The company's main export markets for phosphoric acid were India, Italy, and Turkey, and the main export markets for phosphate rock were Brazil (about 42%), France, Ireland, Italy, the Netherlands, Spain, and the United Kingdom. In 2000, production of phosphate rock fell to about 4.11 Mt from 4.13 Mt, and exports of phosphate rock fell to 1.13 Mt from 1.23 Mt (Fertilizer Markets, 2001).

Potash.—The Dead Sea has enormous resources of potassium; an estimated 7,260 Mt of potassium, which included 2,050 Mt of potassium chloride (KCl) is dissolved in seawater (Abu-Ajamieh, 1989, p. 61). Carnallite that contains potassium from the Dead Sea is used as raw material for Israel's potash plants. DSW was the world's fourth largest producer of potash, and its Israeli plants accounted for about 7% of world production. The company's production of potash increased modestly in 2000, and exports rose to 1.48 Mt from 1.34 Mt. About 87% of DSW's production was exported in 2000; Brazil accounted for 26% of DSW's exports, and India and China accounted for 19% and 13%, respectively (Fertilizer Markets, 2001).

DSW completed a 3-year expansion program to increase its potash capacity by 300,000 t/yr at the end of 2000. The expansion included the installation of two Sahut Conreur compactors (Fertilizer Markets, 2001). With DSW's new program to increase potash production capacity by an additional 450,000 t/yr, the total increase in capacity will be 750,000 t/yr.

Salt.—Israel's resources of salt (NaCl) are very substantial; an estimated 12,650 Mt of NaCl is dissolved in the waters of the Dead Sea (Jordan Natural Resources Authority, 1989, p. 132, 134). DSW was the largest producer of salt in Israel. The company obtained salt separated from carnallite during the potash production process, which is used in local electrolysis, in deicing and fish pickling in Europe, and as table salt in Israel and abroad. DSW's production amounted to about 500,000 t/yr (Harben and Minister, 1997, p. 52). Israel Salt Industries Ltd. was another domestic producer.

Silica Sand.—At the Hatira plant, NIM mined and screened high-purity silica sand, which was used in the ceramics, construction, die casting, and flat and container glass industries (Harben and Minster, 1997, p. 61). NIM's silica sand is used by Phoenicia America-Israel (Flat Glass) Ltd., which was Israel's sole producer of float and pattern glass. Phoenicia's Zipporit plant produced 150,000 t of float, pattern, and other types of glass in 2000. Sales in 2000 amounted to $72 million, of which $42 million was exported to Australia, Cyprus, Egypt, Greece, Italy, Jordan, Latin America, South Africa, and the United Kingdom (Dun & Bradstreet, 2000, Phoenicia America-Israel (Flat Glass) Ltd. profile, accessed August 23, 2001, at URL http://duns100.dundb.co.il/1487).

Mineral Fuels

Coal.—Most Israeli energy demand were met through imports. All Israel's coal supplies (about 9.6 Mt in 1999) were imported; about half was sourced from South Africa, and the rest, in order of importance, from Colombia, the United States, Australia, Indonesia, and Poland. In March 2000, officials of the National Coal Supply Corporation announced plans to increase imports of coal from Australia. Growth in coal imports was being driven mainly by rapid growth in electricity demand. With the expansion of Israel's fourth coal-fired power plant, the country's coal imports could rise by 15% by 2002 (U.S. Energy Information Administration, October 25, 2000, Israel—Coal, Country analysis brief, accessed May 24, 2001, at URL http://www.eia.doe.gov/cabs/israel.html).

Natural Gas.—In 2000, two major discoveries of gas were made at Gaza Marine, and Mari B. Israel hosted a substantial increase in drilling compared with that of 1999 and offered 18 new licenses (Cross, 2001). Israel's petroleum authority estimated that Israel has 85 billion to 142 billion cubic meters in natural gas reserves, which may be enough to supply Israeli demand for years (U.S. Energy Information Administration, October 25, 2000, Israel—Natural gas, Country analysis brief, accessed May 24, 2001, at URL http://www.eia.doe.gov/cabs/israel.html).

Petroleum.—The Petroleum Commission estimated Israel's oil reserves to be 5 billion barrels, most of which was associated with natural gas. Israel produced less than 0.1% of its oil demand; major import sources included Egypt, Mexico, the North Sea, and West Africa. Israel's geographic location between the Arabian Peninsula and the Mediterranean Sea could make the country an alternative route for Persian Gulf oil to the West. This restructuring of oil flows is unlikely to occur in the near future; a comprehensive settlement of the Arab-Israeli conflict would be necessary (U.S. Energy Information Administration, October 25, 2000, Israel—Oil, Country analysis brief, accessed May 24, 2001, at URL http://www.eia.doe.gov/cabs/israel.html).

Infrastructure

In 1999, Israel produced 39,180 gigawatthours (GWh) of electricity. After its own use in production and losses in distribution, 34,300 GWh was available for consumption. About 26% of available power was consumed by the manufacturing sector. Production of electricity has increased by 29% since 1995 (Israel Central Bureau of Statistics, 2000, p. 15.1, 15.3).

According to Israel's national utility the Israel Electric Corporation (IEC), installed electric generating capacity amounted to 8.6 gigawatts (GW) in 1999. Coal-fired plants accounted for 70% of capacity; fuel-oil-fired plants, 25%; and gasoil and independent power producers (IPPs), 5%. Israel made substantial use of solar energy to heat water. Because Israel's power demand is increasing rapidly, the IEC estimated that it will be necessary to increase capacity to more than 10 GW by 2002 and 14.3 GW by 2010 (U.S. Energy Information Administration, October 25, 2000, Israel—Electricity, Country analysis brief, accessed May 24, 2001, at URL http://www.eia.doe.gov/cabs/israel.html).

To meet increasing demand, the IEC planned to raise $1.2 billion to $1.3 billion per year in new financing for generation, transmission, and distribution systems. The IEC was converting some of its oil- and diesel-fired generators to gas generators, and planned to have 25% of its power generated by gas within the next 5 years. On June 29, 2000, a new coal plant at the Mediterranean Sea port of Ashkelon was inaugurated. This facility, which has a capacity of 1.1 GW, was the first power plant in Israel to have sophisticated antipollution scrubbers. IEC planned to spend about $1 billion during the next 10 years to help reduce emissions from its power plants (U.S. Energy Information Administration, October 25, 2000, Israel—Electricity, Country analysis brief, accessed May 24, 2001, at URL http://www.eia.doe.gov/cabs/israel.html).

The IEC's plan for greater reliance on natural gas would increase diversity in energy sources, benefit the environment, and reduce the IEC's electric generation costs. As of mid-2000, the IEC reportedly was studying proposals from BG Group, East Mediterranean Gas Company, Sdot Yam, and Yam Thetis to supply 7 million cubic meters per day to its powerplants. Israel was exploring the possibility of other domestic energy sources, such as oil shale from Nahal Zin and solar power (U.S. Energy Information Administration, October 25, 2000, Israel—Electricity, Country analysis brief, accessed May 24, 2001, at URL http://www.eia.doe.gov/cabs/israel.html). Israel's known exploitable potential hydroelectric energy is 1.6 GW (World Resources Institute and others, 1996, p. 289).

Other developments in the power sector included privatization and regional cooperation. The Ministry of Energy directed the IEC to purchase at least 900 megawatts (MW) of power from IPPs by 2005. About 150 MW was expected to come from solar and wind facilities, and the rest, mainly from natural-gas-fueled facilities; the goal was for 10% of electricity to be produced by IPPs. Israel and Jordan have discussed the possibility of linking their power grids and jointly building several power stations. The proposed stations included a 1,000-MW-capacity plant on the Israeli-Jordanian border, an 800-MW-capacity plant in Jordan, a 150-MW-capacity solar thermal plant near Eilat, and a 100-MW-capacity wind farm. The IEC also explored the possibility of cooperating in the development of wind power with Syria. These plans would depend on a successful Israeli-Syrian peace treaty. The IEC has estimated that as much as 10% of Israel's power supplies could be imported in the future (U.S. Energy Information Administration, October 25, 2000, Israel—Electricity, Country analysis brief, accessed May 24, 2001, at URL http://www.eia.doe.gov/cabs/israel.html).

Israel's transportation network comprised nearly 16,000 kilometers (km) of paved highways and 610 km of railroads. There were 708 km of pipelines for crude oil, 290 km for petroleum products, and 89 km for natural gas. Ports and harbors were Ashdod, Ashkelon, Eilat, Hadera, Haifa, and Tel Aviv-Yafo (U.S. Central Intelligence Agency, 2000).

Outlook

The outlook for Israel's bromine, lead, magnesia, phosphate, potash, and salt industries depends heavily upon world market conditions for these commodities; the cement, crushed stone, gypsum, lime, marble, and natural gas industries are more dependent upon the strength of the Israeli economy. Unrest owing to the collapse of the peace process could have substantial effects upon the economy in 2001.

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TABLE 1
ISRAEL: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/		1996	1997	1998	1999 e/	2000 e/
METALS						
Iron and steel, steel, crude e/		246,000 r/	268,000 r/	244,000 r/	280,000 r/	285,000
Lead, refined		12,000	12,000	12,000	13,000	13,200
Magnesium metal		100 e/	7,000 r/	25,000	28,000 3/	34,000
INDUSTRIAL MINERALS						
Bromine:						
Elemental		154,000 r/	180,000 3/	185,200 r/ 3/	185,000	200,000
Compounds e/		143,000 r/	167,000 r/	172,000 r/	172,000 r/	186,000
Caustic soda e/		41,000 r/ 3/	41,700 r/	41,700 r/	41,200 r/	42,600
Cement, hydraulic	thousand tons	5,600 r/	5,400	6,476 r/	6,354 r/ 3/	6,600
Clays:						
Flint clays		50,000 r/	45,000 r/	23,000 r/	23,200 r/	22,700
Kaolin		14,000 r/	16,000 r/	27,000 r/	27,300 r/	26,700
Other e/		8,500	8,500	8,500	8,500	8,500
Diamonds 4/	thousand carats	2,522	2,373	1,795	1,833 3/	1,900
Gypsum		161,000 r/	120,875 r/	56,000 r/	50,000 3/	45,800
Lime e/		275,000	344,000 r/ 3/	378,000 r/ 3/	336,000	308,000
Magnesia, Mg content e/		42,200	53,300 r/	57,000 r/	57,000 r/ 3/	57,000 3/
Nitrogen, N content of ammonia and urea		64,600 e/	56,600	500	-- 3/	-- 3/
Phosphate:						
Phosphate rock:						
Beneficiated	thousand tons	3,839	4,047	4,067 r/ 3/	4,128 r/ 3/	4,110 3/
P_2O_5 content	do.	1,201 r/	1,260	1,288 r/	1,310 r/	1,300
Phosphatic fertilizers	do.	1,300	1,800	1,700 e/	1,600	1,590
Phosphoric acid, P_2O_5 equivalent e/		390,000	630,000	650,000	600,000	590,000
Potash, K_2O equivalent	do.	1,500	1,488	1,668	1,702	1,710
Salt, marketed (mainly marine)	do.	765 r/	750 r/	874 r/	883 r/	863
Sand: e/						
Silica sand		284,000 r/	275,000 r/ 3/	257,000 r/ 3/	249,000 r/	243,000
Other e/	thousand tons	11,400 r/	11,000 r/ 3/	9,000 r/ 3/	8,730 r/	8,530
Sodium and potassium compounds, caustic soda e/		29,900 r/	30,400 r/	30,400 r/	30,000 r/	31,100
Stone: e/						
Crushed	thousand tons	36,200 r/	35,000 r/ 3/	33,000 r/ 3/	32,000 r/	31,200
Dimension, marble	do.	12,000	12,000	12,000	12,000	12,000
Sulfur:						
Byproduct from petroleum	do.	24 r/	30 r/	32 r/	31	31
Sulfuric acid e/	do.	135 r/	137 r/	137 r/	135 r/	140
MINERAL FUELS AND RELATED MATERIALS						
Gas, natural: e/						
Gross	thousand cubic meters	13,500 r/	14,200 r/	11,400 r/	10,000 r/	9,300
Dry	do.	13,500 r/	14,200 r/	11,400 r/	10,000 r/	9,300
Petroleum:						
Oil shales		420,800	471,800	443,900	449,400	465,000
Crude	42-gallon barrels	32,296 r/	33,764 r/	38,902 r/	31,562 r/ 3/	31,600
Refinery products:						
Liquified petroleum gas	do.	3,222 r/	3,566 r/	3,509 r/	3,482 r/ 3/	3,600
Gasoline	do.	17,309 r/	17,107 r/	17,080 r/	18,812 r/ 3/	19,400
Naptha	do.	5,997 r/	6,369 r/	7,287 r/	7,086 r/ 3/	7,320
Kerosene	do.	7,977 r/	7,734 r/	8,189 r/	8,702 r/ 3/	8,990
Distillate fuel oil	do.	13,932 r/	14,308 r/	15,573 r/	16,683 r/ 3/	17,200
Residual fuel oil	do.	10,525 r/	9,688 r/	9,584 r/	9,469 r/ 3/	9,790
Other e/	do.	3,960 r/	4,320 r/	5,270 r/	5,130 r/	5,300
Total	do.	62,922 r/	63,092 r/	66,492 r/	69,364 r/	71,600

e/ Estimated. r/ Revised. -- Zero.
1/ Table includes data available through June 26, 2001.
2/ In addition to the commodities listed, a variety of other crude construction materials are produced, but available information is inadequate to make estimates of output.
3/ Reported figure.
4/ Imported diamonds cut in Israel.